Group 2 Electives

# CMPUT 250

* **Course Description:**  
  An interdisciplinary course for students in Science, Arts, and other faculties. The focus is on games as interactive entertainment, their role in society, and how they are made. Teams composed of students with diverse backgrounds (e.g. English, Art and Design, and Computing Science) follow the entire creative process: from concept, through pitch, to delivery, of a short narrative-based game using a commercial game engine. To achieve the required mix of backgrounds and experience, students must apply to be considered for this course. See the Department web site for the online form.
* **Prerequisite:** Second-year standing
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024, Winter Term 2025
* **Instructor(s):**Matthew Guzdial (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Matthew Guzdial's Rate My Professor rating is 4.9/5
* **Course Difficulty:** CMPUT 250 is a challenging course that requires a significant time commitment. Students have reported spending a lot of time on the midterm, final, labs, and group project. The tests and labs are relatively easy if one attends lectures, but the group project can be manageable with a good group or present a serious workload otherwise. Additionally, for students taking on the music role, they may find that the amount of music required depends on the game they choose to make, and they may spend more time creating sound effects than actual tracks. The use of RPG maker for the course reduces the need for extensive programming for this role, but some programming skills can be helpful. Overall, students should expect a substantial workload for this course.

# CMPUT 304

* **Course Description:**  
  The second course of a two-course sequence on algorithm design. Emphasis on principles of algorithm design. Categories of algorithms such as divide-and-conquer, greedy algorithms, dynamic programming; analysis of algorithms; limits of algorithm design; NP-completeness; heuristic algorithms.
* **Prerequisites:** CMPUT 204; one of STAT 151, 161, 181, 235, 265, SCI 151, or MATH 181; and one of MATH 225, 227, or 228
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The course CMPUT 304 is reported to be relatively low maintenance in terms of assignments and assessments, with the professor's teaching style being a major source of frustration for many students. Several students have mentioned feeling lost in class and having difficulty understanding the professor's explanations. Some students have resorted to self-teaching and using external resources such as GitHub code and ChatGPT to learn the material. The professor's teaching effectiveness is a significant concern for students, with some expressing that they have had better experiences with less effective teachers in the past. However, the course itself is described as being manageable as long as students complete the assignments.

# CMPUT 307

* **Course Description:**  
  An introductory course on the theory and applications of computer based 3D modeling and animation. The course will cover a selection of topics from overview of tools supporting modeling and animation, automatically generating 3D models, and animation of skeleton based models through algorithms and software. Applications of 3D modeling and animation in games, virtual/augmented environments, movies, and emerging video transmission algorithms will be discussed.
* **Prerequisites:** one of CMPUT 206, 308, or 411; or consent of the instructor
* **Terms the course is available in:**Winter Term 2024
* **Instructor(s):**Anup Basu (teaching in Winter Term 2024),
* **Instructor ratings:**Anup Basu's Rate My Professor rating is 4.3/5
* **Course Difficulty:**307 is considered a challenging course, with prerequisites that include knowledge from CMPUT 206, 308, or 411. Some students suggest that having a strong background in 3D math, specifically Linear Algebra II, is helpful. The textbook for the course, 366, has been criticized for being incomplete and poorly written, with assignments reportedly taking a long time to be marked and exams focusing heavily on memorization of formulas. Some students have expressed frustration with the course's difficulty and the lengthy wait for marks. It is also mentioned that 403, which focuses on algorithmic concepts, could be a good alternative for those who enjoy that subject.

# CMPUT 325

* **Course Description:**  
  A study of the theory, run-time structure, and implementation of selected non-procedural programming languages. Languages will be selected from the domains of functional, and logic-based languages.
* **Prerequisites:** CMPUT 201 and 204 or 275; one of CMPUT 229, E E 380 or ECE 212, and MATH 125
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Jia-Huai You (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**The professor does not have a rating on Rate My Professor
* **Course Difficulty:** Based on the context, it seems that the course CMPUT 325 has an assignment that is similar to the questions on the midterm. This suggests that the course may have a strong emphasis on applying concepts learned in class to real-world problems. The fact that someone who has taken the course before recognizes the similarity between the assignment and the midterm questions indicates that the material covered in the course may be challenging but rewarding, as students are expected to understand and apply concepts in a practical setting.

# CMPUT 350

* **Course Description:**  
  This course focuses on state-of-the-art AI and graphics programming for video games. Part 1 introduces C++, the language of choice for video game engines, emphasizing efficiency, safety, the Standard Template Library, and OpenGL. Part 2 on real time strategy deals with efficient pathfinding algorithms, planning, and scripting AI systems. Student projects give hands-on experience directly applicable to the video games industry.
* **Prerequisites:** CMPUT 201 or 275, and 204
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The course CMPUT 350 is known to be challenging and project-heavy, with a significant workload. Students are advised to stay on top of the material, practice consistently, and not fall behind. The course covers various topics, some of which may be familiar from other courses like algorithms or software engineering design patterns. The assignments take a considerable amount of time to complete, and students may encounter difficulties with the labs. The group project can also be challenging, and some students may need to carry less motivated group members. It is recommended to take the course with a supportive and knowledgeable TA, and to be prepared for a substantial time commitment. Some students have reported that the course was worth the effort, despite the challenges. It is also suggested that taking CMPUT 350 and 301 at the same time can be beneficial due to the complementary nature of the courses. However, the workload will be substantial.

# CMPUT 366

* **Course Description:**  
  This course provides an introduction to search and planning in artificial intelligence. The course covers deterministic single-agent and multi-agent problems. Students will learn how to model real-world problems as state-space search problems and how to solve such problems. The course covers algorithms for solving deterministic shortest path problems with factored and non-factored states, combinatorial optimization problems, constraint satisfaction problems, and multi- agent problems.
* **Prerequisites:** CMPUT 204 or 275, and CMPUT 272
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024
* **Instructor(s):**Levi Santana de Lelis (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**The professor does not have a rating on Rate My Professor
* **Course Difficulty:** CMPUT 366 is considered to be a relatively fair course by some students, but others have found it to be quite challenging, with some even describing the experience as "considerable pain" when taking the final exam.

# CMPUT 391

* **Course Description:**  
  This course covers the implementation of RDBMSs and some non- relational data models, along with their query languages. Topics: compilation, execution, and optimization of SQL queries; concurrent execution of transactions; indexing; advanced constructs in SQL; semi-structured data models and query languages; distributed and parallel databases; NoSQL and cloud-based database systems.
* **Prerequisites:** CMPUT 201 and 204, or 275; and CMPUT 291
* **Terms the course is available in:**No term decided yet/not offered this year
* **Instructor(s):**No instructor teaching the course
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The comments suggest that the course CMPUT 391 is generally considered to be difficult by students, with some expressing frustration over the final exam and the harsh grading. The course material covers the in-depth workings of a DBMS, including algorithms for table scans, joins, and various types of databases. Some students have had positive experiences with the professor, while others have reported clueless TAs and a lack of overlap between assignments and lectures. The course now uses SQLite3 and C for the assignments, and students can find more information on the assignments on the professor's website. Some students have suggested that the course may be worth avoiding unless the instructor or material changes. The comments also mention that the course is relatively hard and requires a lot of reading and math, and that students should consider finding the easiest course to graduate if they are not very interested in databases. Some students have expressed concerns about the professor's grading policy and have encouraged others to voice their concerns to the faculty. Overall, the comments suggest that the course is challenging and may be worth taking only if students are interested in the material and are prepared for the workload and potential difficulties.

# CMPUT 404

* **Course Description:**  
  Introduction to modern web architecture, from user-facing applications to machine-facing web-services. Topics include: the evolution of the Internet, relevant technologies and protocols, the architecture of modern web-based information systems, web data exchange and serialization, and service-oriented middleware.
* **Prerequisites:** CMPUT 301 and 291, or consent of the instructor
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024, Winter Term 2025
* **Instructor(s):**Hazel Campbell (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Hazel Campbell's Rate My Professor rating is 1.7/5
* **Course Difficulty:** The course CMPUT 404 is considered to be quite difficult, with a heavy workload comparable to CMPUT 301. It covers topics such as JavaScript, Ajax, HTML/CSS, webservers, websockets, REST APIs, and Django/Flask backends using Python. The course is intended for newcomers and does not require prior experience with the languages. The course materials, including slides, are available online for self-study.

# CMPUT 411

* **Course Description:**  
  2D and 3D transformation; 3D modeling and viewing; illumination models and shading methods; texture mapping; ray tracing.
* **Prerequisites:** CMPUT 204 or 275, 301; one of CMPUT 340, 418 or equivalent knowledge, and MATH 214
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Pierre Boulanger (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**The professor does not have a rating on Rate My Professor
* **Course Difficulty:**Insufficient information available on course difficulty

# CMPUT 415

* **Course Description:**  
  Compilers, interpreters, lexical analysis, syntax analysis, syntax- directed translation, symbol tables, type checking, flow analysis, code generation, code optimization.
* **Prerequisites:** one of CMPUT 229, E E 380, or ECE 212, and any 300-level Computing Science course
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:**415 is a challenging course with a significant workload, attracting high achievers and those with an interest in compilers. The course material is now in C++ and involves several projects that ramp up in scale and sophistication, with the final project being a group effort. The course covers a lot of material and requires a good understanding of Java, as well as familiarity with parser generators and intermediate languages such as LLVM. The workload is constant and the course is known for being the most work-intensive in the CMPUT program.

# CMPUT 466

* **Course Description:**  
  Learning is essential for many real-world tasks, including recognition, diagnosis, forecasting and data-mining. This course covers a variety of learning scenarios (supervised, unsupervised and partially supervised), as well as foundational methods for regression, classification, dimensionality reduction and modeling. Techniques such as kernels, optimization and probabilistic graphical models will typically be introduced. It will also provide the formal foundations for understanding when learning is possible and practical. Credit cannot be obtained for both CMPUT 367 and CMPUT 466.
* **Prerequisites:** CMPUT 204 or 275; MATH 125; CMPUT 267 or MATH 214; or consent of the instructor
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024
* **Instructor(s):**Bailey Kacsmar (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**The professor does not have a rating on Rate My Professor
* **Course Difficulty:** The course CMPUT 466 is known to have a significant amount of calculus and statistics, making it a challenging course for those who dislike or struggle with these subjects. It is recommended for those interested in machine learning to take additional courses such as STAT 265, 266, 371, and 372, but these courses also require a strong background in mathematics. Alternatively, there are online courses available on Coursera that cover the material taught in CMPUT 466. The course has a final project, assignments, and exams, with the exams being open-ended and requiring clear communication of machine learning concepts. The course is taught using Python. CMPUT 366 is the introductory machine learning course and has different prerequisites.

# ECE 360

* **Course Description:**  
  Linear system models. Time response and stability. Block diagrams and signal flow graphs. Feedback control system characteristics. Dynamic compensation. Root locus analysis and design. Frequency response analysis and design. Credit may be obtained in only one of ECE 360, ECE 362, E E 357, E E 462 or E E 469.
* **Prerequisites:** ECE 203 or E E 250, and ECE 240 or E E 238
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024, Winter Term 2025
* **Instructor(s):**Tongwen Chen (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Tongwen Chen's Rate My Professor rating is 3/5
* **Course Difficulty:**442, the multimedia signal processing course, is generally considered to be one of the easier courses in the ECE curriculum, according to the provided comments. However, there is a course called 441, which is about machine learning, that some students find to be more fun and interesting. If you have specific questions about the course, it may be helpful to ask in the ECE labs discord or start a discussion on e-class. The confusion seems to be related to the project aspect of the course, rather than the lecture content.

# ECE 370

* **Course Description:**  
  Review of vector calculus, electrostatics, and magnetostatics. Electric and magnetic fields in material media, including polarization mechanisms and general boundary conditions. Solutions to static field problems. Maxwell's equations and waves in free space, dielectrics and conducting media. Reflection and refraction, standing waves. Credit may be obtained in only one of ECE 370 or E E 315.
* **Prerequisites:** MATH 102, 209 and PHYS 230
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The course ECE 370 is reportedly difficult by some students, with one commenter describing the professor as terrible, biased, and not teaching effectively. The professor is said to have favoritism towards certain students, not provide proper notes, and have a high ego. The passing mark for the course is unclear. The textbooks used for the course may vary, with one commenter mentioning Engineering Electromagnetics by Hayt and another mentioning a textbook with a focus on the differential forms of Maxwell's equations. Despite the challenges, some students have managed to do better than expected in the course.

# ECE 380

* **Course Description:**  
  Basics of analog communication: amplitude, angle, and analog pulse modulation; modulators and demodulators; frequency multiplexing. Basics of digital communication: sampling, quantization, pulse code modulation, time division multiplexing, binary signal formats. Credit may be obtained in only one of ECE 380 or E E 390.
* **Prerequisite:** ECE 240 or E E 238
* **Terms the course is available in:**Winter Term 2024, Fall Term 2024, Winter Term 2025
* **Instructor(s):**Xingyu Li (teaching in Winter Term 2024), Instructor(s) undecided for Fall Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**The professor does not have a rating on Rate My Professor
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 405

* **Course Description:**  
  Introduction to the principles of biophysical instrumentation. Various sensors are examined including strain gauges, inductive, capacitive, thermal, and piezoelectric sensors. Methods of measuring blood pressure are discussed. Origin of biopotentials; membrane and action potentials. Measurement of bioelectrical signals such as the ECG and EMG. Electrical safety, noise, impedance matching, and analog-to-digital conversion. Applications of electrodes, biochemical sensors, and lasers. Credit may be obtained in only one of ECE 405 or EE BE 512.
* **Prerequisite:** ECE 203 or E E 250 or consent of the Instructor
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** ECE 405, Biophysical Instrumentation and Measurement, is a course that has very few students enrolled in it, with an average of 50 students per semester for the past dozen years. Despite the low enrollment, the course is still being offered. The course is known to have a significant amount of calculations and theoretical questions on assignments and exams, but is considered to be fairly straightforward. The first person to take the course since 2011 is currently reviewing the 2011 practice midterm to get an idea of the time crunch.

# ECE 406

* **Course Description:**  
  This course is intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Department of Electrical and Computer Engineering or the Department of Computing Science or other appropriate departments.
* **Prerequisites:**None
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 407

* **Course Description:**  
  This course is intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Department of Electrical and Computer Engineering or the Department of Computing Science or other appropriate departments.
* **Prerequisites:**None
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Instructor(s) undecided for Winter Term 2024, Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 423

* **Course Description:**  
  Topics include distributed communication models (e.g., sockets, remote procedure calls, distributed shared memory), distributed synchronization (clock synchronization, logical clocks, distributed mutex), distributed file systems, replication, consistency models, fault tolerance, QoS and performance, scheduling, concurrency, agreement and commitment, Paxos-based consensus, MapReduce and NoSQL datastores, cloud infrastructures and microservices.
* **Prerequisites:** CMPUT 379 and (ECE 487 or CMPUT 313)
* **Terms the course is available in:**No term decided yet/not offered this year
* **Instructor(s):**No instructor teaching the course
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 440

* **Course Description:**  
  Extension of sampling theory and the Fourier transform to two dimensions, pixel operations including gray-level modification, algebraic and geometric transformations. The design of spatial filters for noise reduction, image sharpening and edge enhancement, and some discussion of interpolation techniques. An introduction to the concepts of image restoration from known degradations and the reconstruction of images from parallel and fan projections. Credit may be obtained in only one of EE BE 540 or ECE 440.
* **Prerequisite:** ECE 340 or E E 338 or consent of Instructor
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 442

* **Course Description:**  
  Human visual/audio perception and multimedia data representations. Basic multimedia processing concepts, multimedia compression and communications. Machine learning tools for multimedia signal processing, including principle component analysis and Gaussian mixture modeling. Applications to human-computer interaction, visual-audio, and visual-text processing. Credit may be obtained in only one of ECE 442 or E E 442.
* **Prerequisites:** ECE 220 or CMPUT 275, ECE 342, MATH 102 or equivalent knowledge
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Li Cheng (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Li Cheng's Rate My Professor rating is 2.5/5
* **Course Difficulty:**Insufficient information available on course difficulty

# ECE 447

* **Course Description:**  
  The course introduces basic concepts and techniques of data analysis and machine learning. Topics include: data preprocessing techniques, decision trees, nearest neighbor algorithms, linear and logistic regressions, clustering, dimensionality reduction, model evaluation, deployment methods, and emerging topics.
* **Prerequisites:** ECE 220 or CMPUT 275, and ECE 342 or STAT 235, or consent of instructor
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Marek Reformat (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Marek Reformat's Rate My Professor rating is 4.7/5
* **Course Difficulty:** ECE 447 is a new course in electrical and computer engineering that focuses on machine learning and data analysis. The course is reportedly disorganized but the professor is great and assessments are considered easy. Some students have suggested that the course may provide a good introduction to machine learning and hands-on experience with data analysis. However, it may be difficult to accurately gauge the content and difficulty of the course due to its newness.

# ECE 449

* **Course Description:**  
  Intelligent systems for automatic control and data analysis. The concepts of vagueness and uncertainty, approximate reasoning, fuzzy rule-based systems and fuzzy control. Strategies for learning and adaptation, supervised and reinforcement learning, self-organization and the selection of neural network architectures. Discussion of the principles of search and optimization, evolution and natural selection and genetic algorithms. Introduction to hybrid intelligence. Applications of intelligent systems for pattern recognition, classification, forecasting, decision support, and control. Credit may be obtained in only one of CMPE 449 or ECE 449.
* **Prerequisites:**None
* **Terms the course is available in:**Fall Term 2024
* **Instructor(s):**Instructor(s) undecided for Fall Term 2024
* **Instructor ratings:**No professors teaching this term, so no ratings available at all
* **Course Difficulty:** The comments suggest that ECE 449 is primarily a programming course, and that lab equipment may not be necessary. However, some components might be required for capstone projects. The overall difficulty of the course is not explicitly stated, but it appears to be more focused on programming than lab work.

# ECE 455

* **Course Description:**  
  Microfluidic and nanobiotechnological devices. Fabrication techniques for devices: self-assembly, lithographic technologies. Applications of nanobiotechnology in computing, electronics, human health, environment and manufacture. Credit may be obtained in only one of ECE 455 or E E 455.
* **Prerequisites:** MATH 201 or PHYS 230
* **Terms the course is available in:**Winter Term 2024, Winter Term 2025
* **Instructor(s):**Xihua Wang (teaching in Winter Term 2024), Instructor(s) undecided for Winter Term 2025
* **Instructor ratings:**Xihua Wang's Rate My Professor rating is 4.5/5
* **Course Difficulty:** Based on the comments, ECE 455 appears to be a challenging course, with some students expressing that it is an "absolute ass" and that they were forced to take it to graduate. In contrast, another student mentioned that they found a group II elective, 442, to be more enjoyable and less difficult, describing it as "the easiest on this list" and "most fun and interesting." It seems that the curriculum for 455 may have changed since the comment about 442 was made, as 442 is described as machine learning, while the original comment does not mention the specific focus of ECE 455.